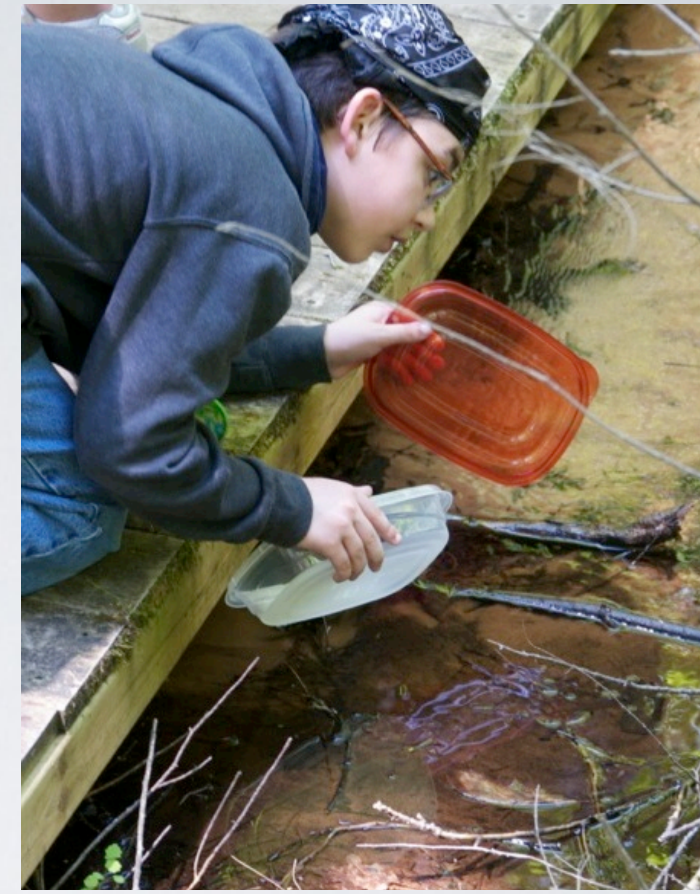
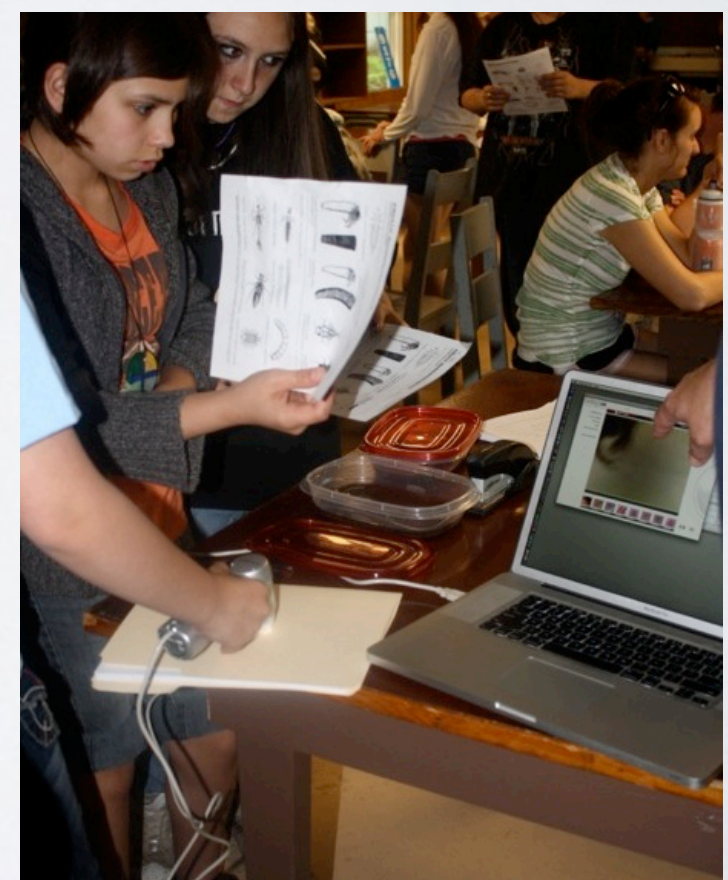
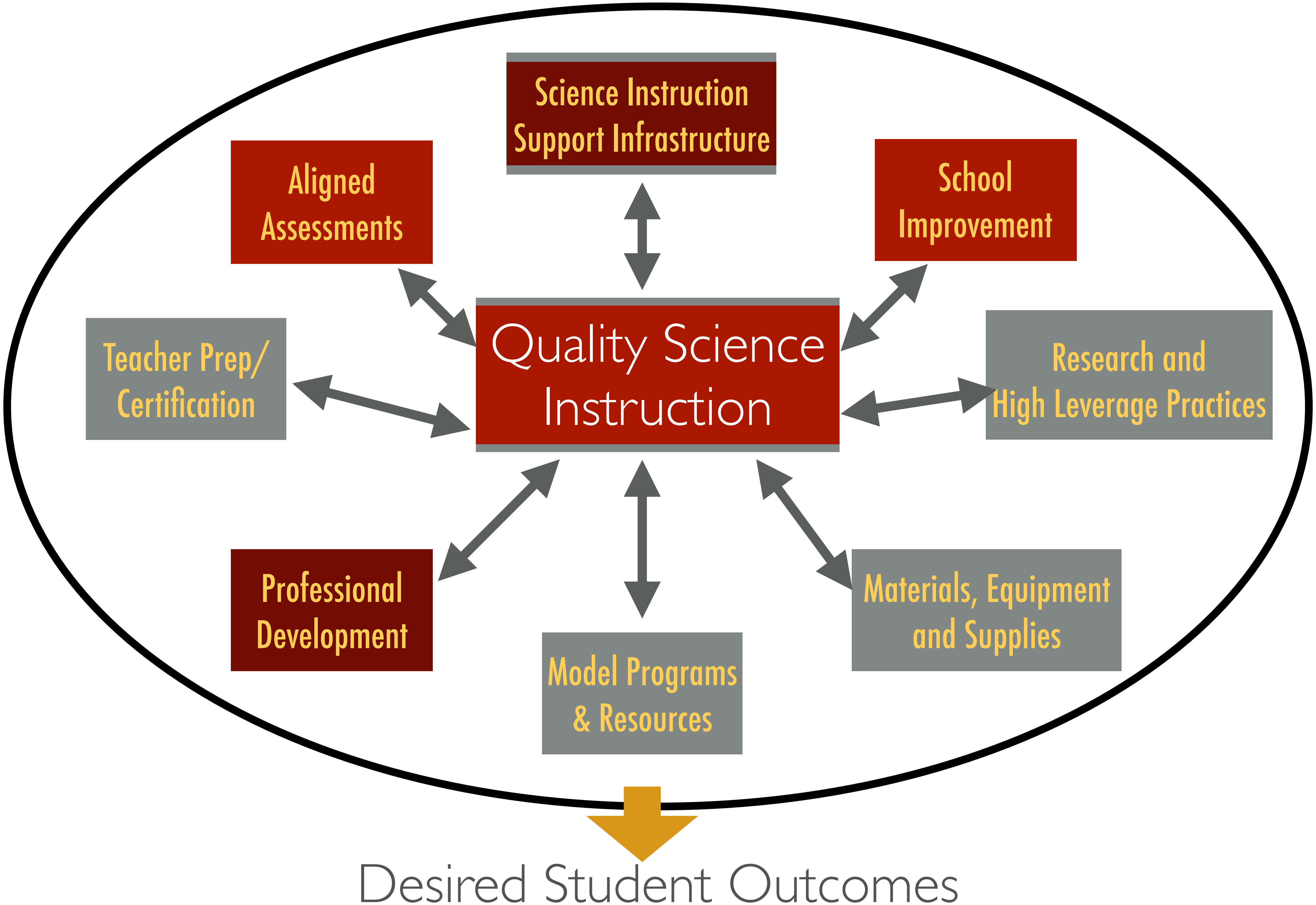
Assessing the Teaching and Learning of Science





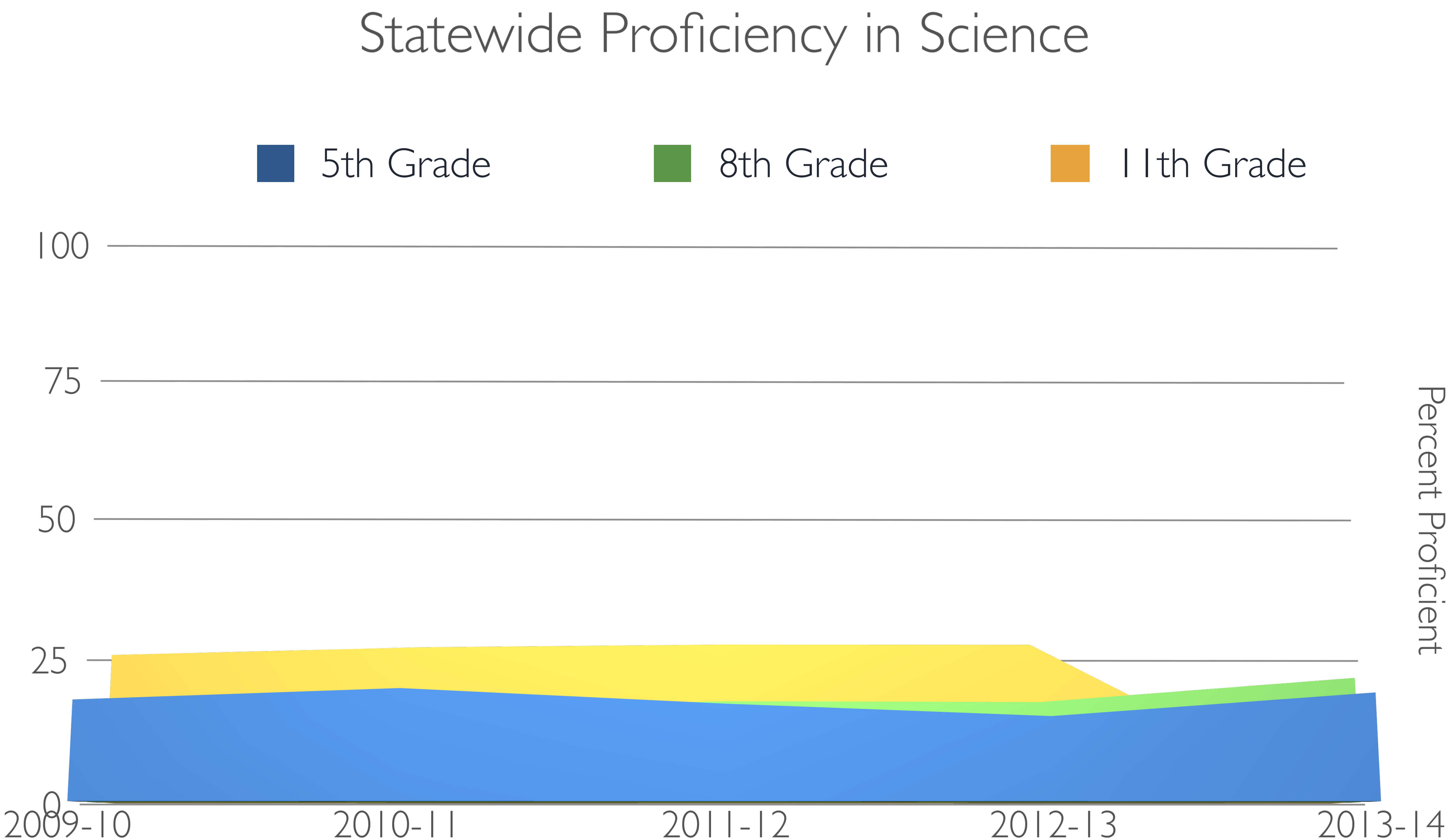
ACHIEVING THE VISION



OBJECTIVES

- Provide a insight into assessment considerations from the classroom level to the state overview (and beyond)
- Address policy considerations (including educator effectiveness, school ranking, and selection of appropriate assessment instruments) that are impacted by science assessment.
- Highlight strategies that will aid in transition to more appropriate student outcomes in science.

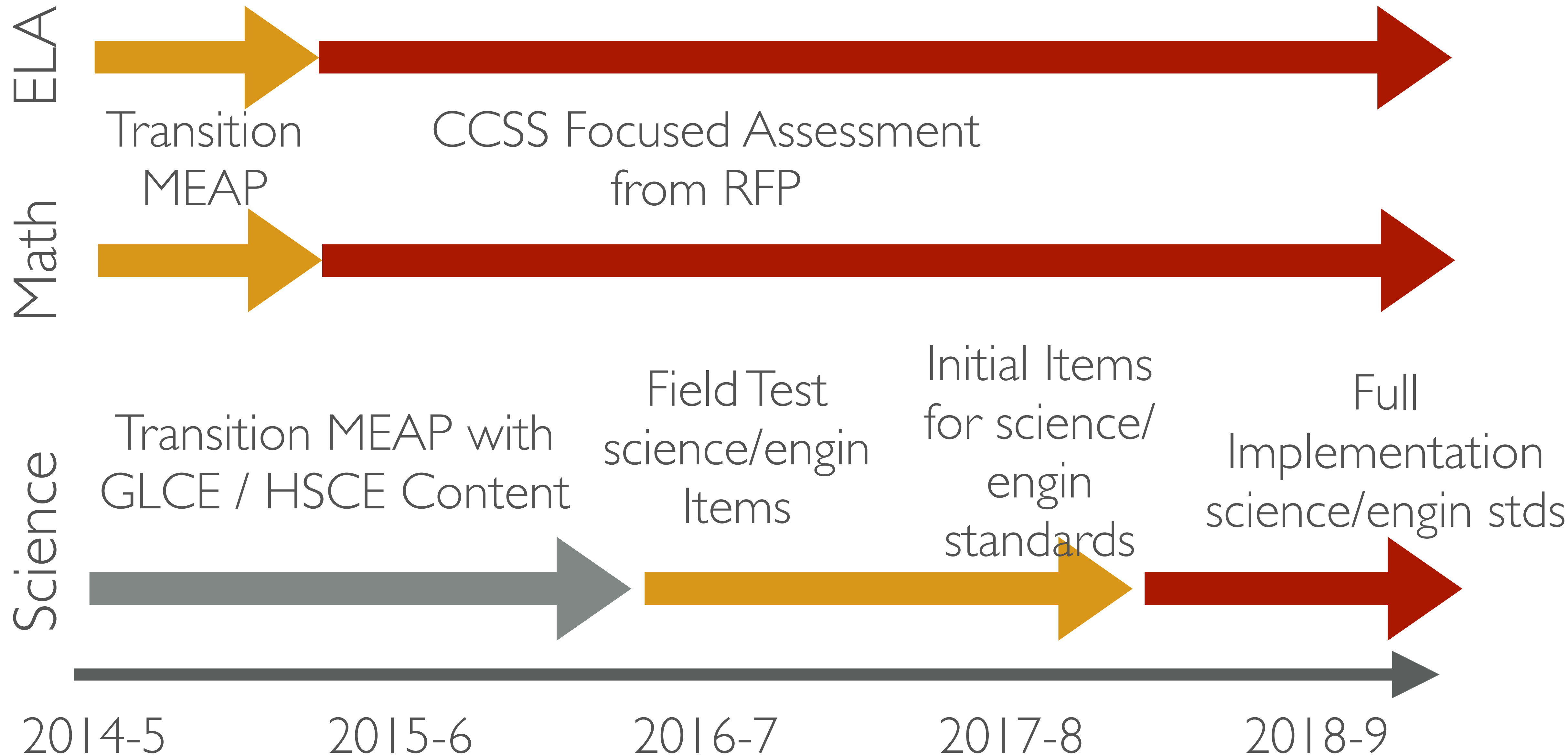
WHERE ARE WE TODAY?



STATE ASSESSMENTS

- Spring Testing for Grades 4, 7, and 11
- Testing during the online assessment window
- Highlight strategies that will aid in transition to more appropriate student outcomes in science.

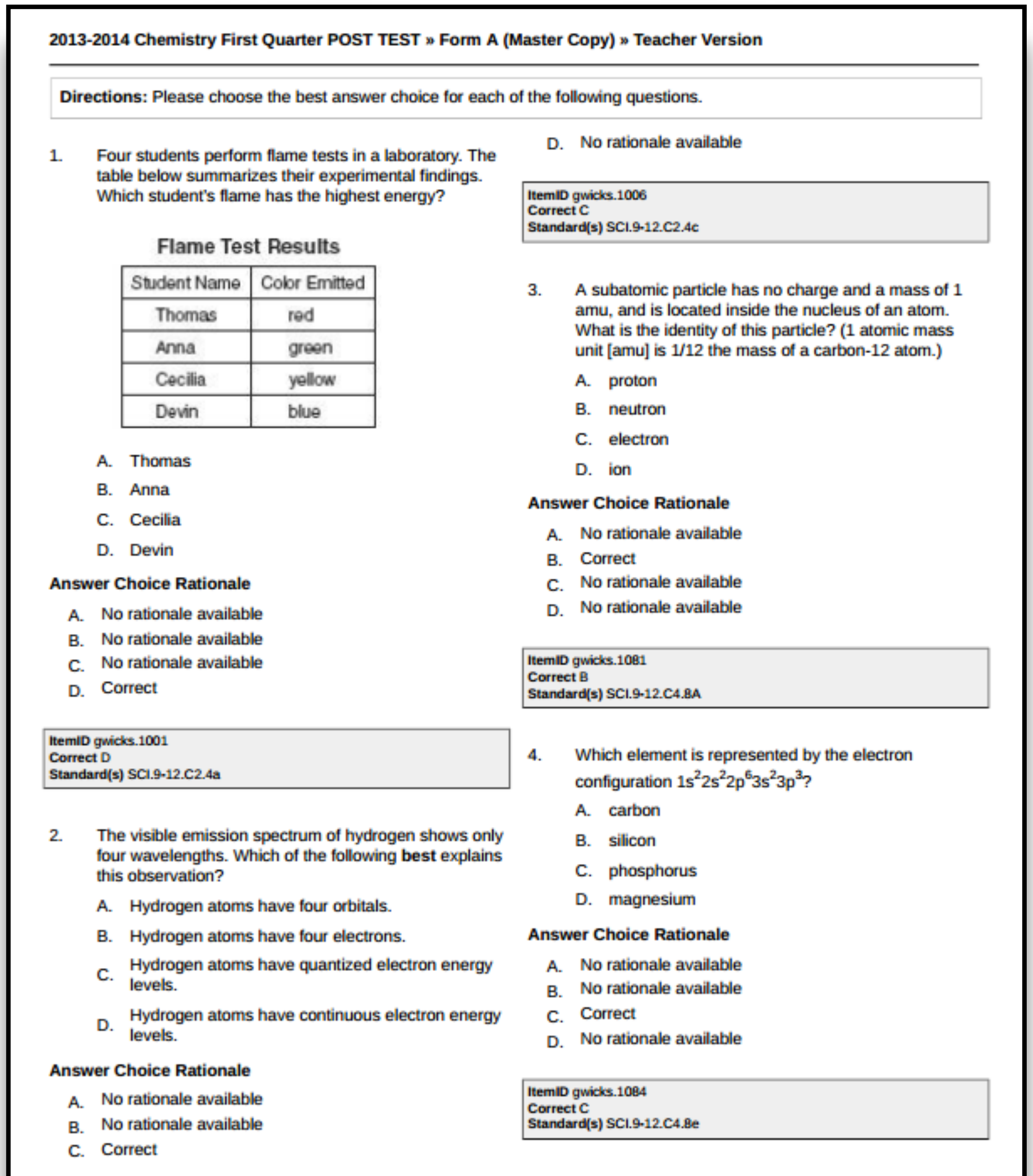
SCIENCE ASSESSMENT TIMELINE



STATE ASSESSMENT OUTCOMES

	State Policy	ISDs, MSCs, & Other Supports	LEAs and Educators	Students and Parents
Immediate outcomes	• Accountability • Identify needs for support or policy change	• Identify needs for professional learning support • Programming	• Educator eval. • Instructional transitions • Professional learning priorities	• Identification of target areas for improvement • Considerations for learning plans
Annual / Biannual outcomes	• Policy implementation over time • Ongoing accountability	• Accountability • Programming • Considerations for partnership	• Accountability • Educator effectiveness • Programming/ policy	• Promote needs of career and college readiness • Curriculum decisions
Long Term outcomes	• Policy outcomes • MI Merit Curriculum • Impact on business / higher education	• Accountability of support providers • Programming • Policy efforts	• Accountability • Identify needs for support or policy change	• Career and college readiness • Awareness of scientific literacy considerations

LOCAL AND REGIONAL ASSESSMENTS FOR SCIENCE



2013-2014 Chemistry First Quarter POST TEST » Form A (Master Copy) » Teacher Version

Directions: Please choose the best answer choice for each of the following questions.

1. Four students perform flame tests in a laboratory. The table below summarizes their experimental findings. Which student's flame has the highest energy?

Flame Test Results

Student Name	Color Emitted
Thomas	red
Anna	green
Cecilia	yellow
Devin	blue

A. Thomas
B. Anna
C. Cecilia
D. Devin

Answer Choice Rationale

A. No rationale available
B. No rationale available
C. No rationale available
D. Correct

ItemID gwicks.1001
Correct D
Standard(s) SCI.9-12.C2.4a

2. The visible emission spectrum of hydrogen shows only four wavelengths. Which of the following **best** explains this observation?

A. Hydrogen atoms have four orbitals.
B. Hydrogen atoms have four electrons.
C. Hydrogen atoms have quantized electron energy levels.
D. Hydrogen atoms have continuous electron energy levels.

Answer Choice Rationale

A. No rationale available
B. No rationale available
C. Correct
D. No rationale available

ItemID gwicks.1006
Correct C
Standard(s) SCI.9-12.C2.4c

3. A subatomic particle has no charge and a mass of 1 amu, and is located inside the nucleus of an atom. What is the identity of this particle? (1 atomic mass unit [amu] is 1/12 the mass of a carbon-12 atom.)

A. proton
B. neutron
C. electron
D. ion

Answer Choice Rationale

A. No rationale available
B. Correct
C. No rationale available
D. No rationale available

ItemID gwicks.1081
Correct B
Standard(s) SCI.9-12.C4.8A

4. Which element is represented by the electron configuration $1s^2 2s^2 2p^6 3s^2 3p^3$?

A. carbon
B. silicon
C. phosphorus
D. magnesium

Answer Choice Rationale

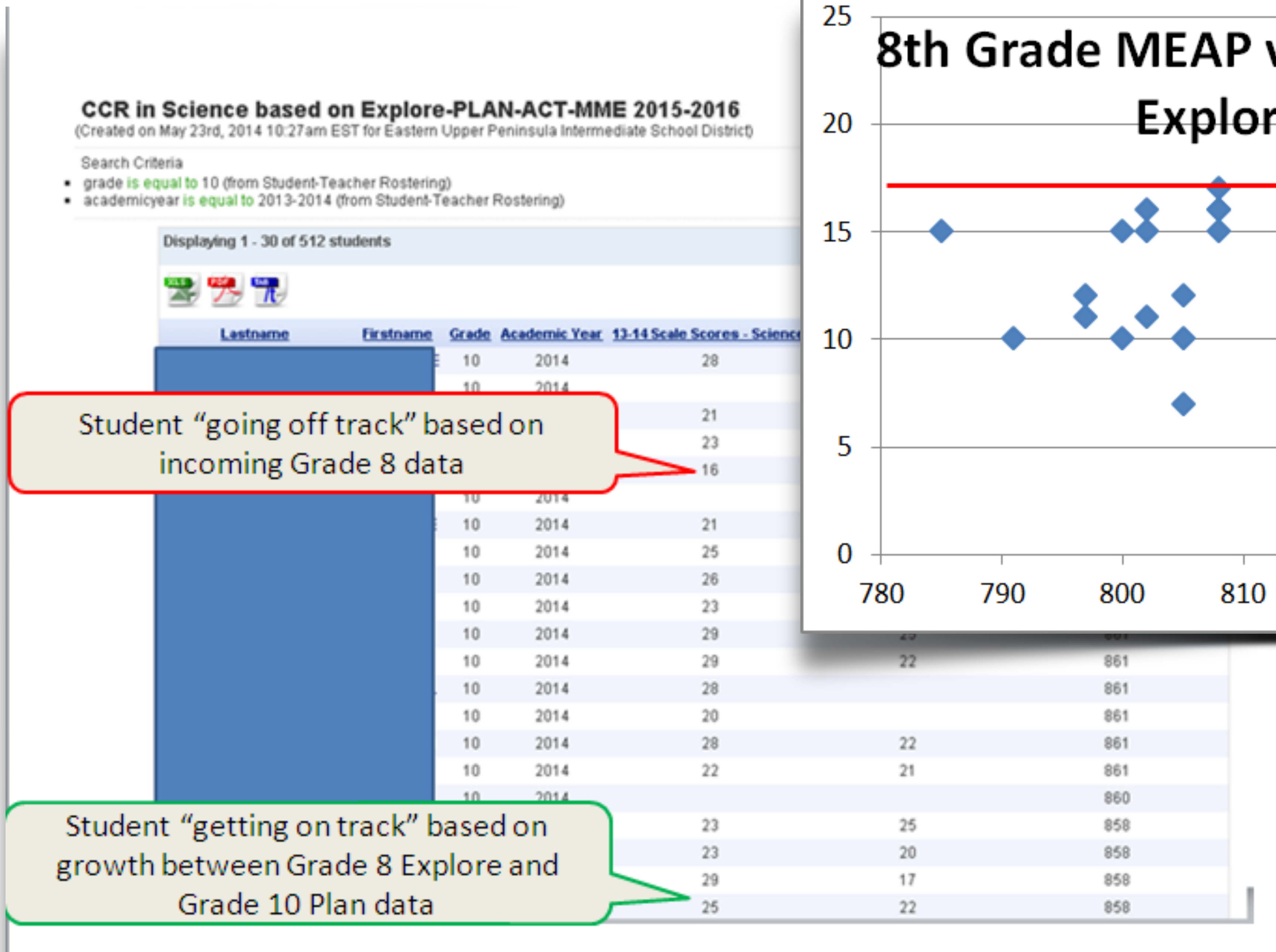
A. No rationale available
B. No rationale available
C. Correct
D. No rationale available

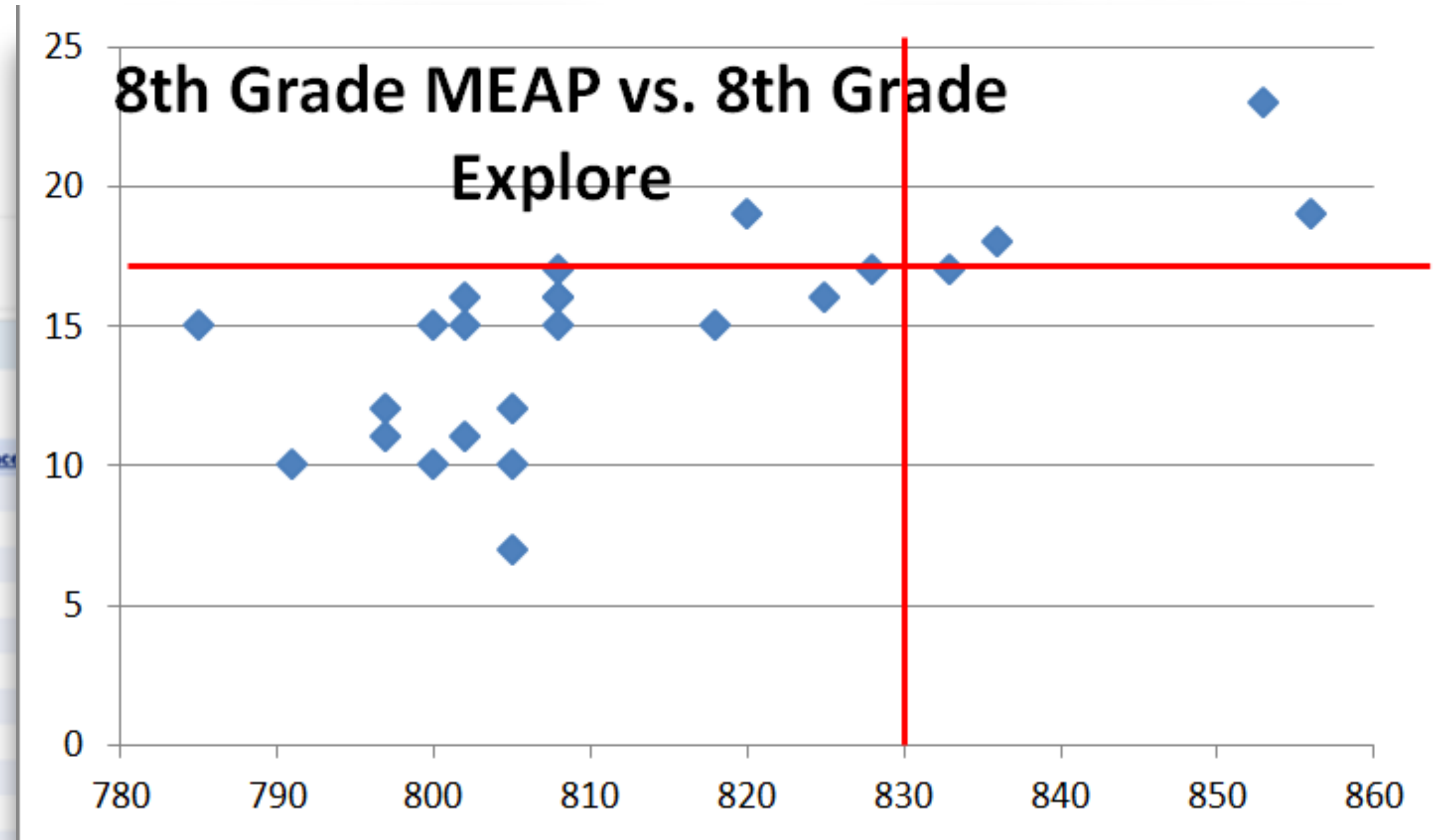
ItemID gwicks.1084
Correct C
Standard(s) SCI.9-12.C4.8e

An example support system:

- Common pre/post or interim and summative assessments for a region
- Utilizes local / regional data management tools
- This becomes the norm to guide supports around…
  - School improvement
  - Professional learning
  - Supports and resources

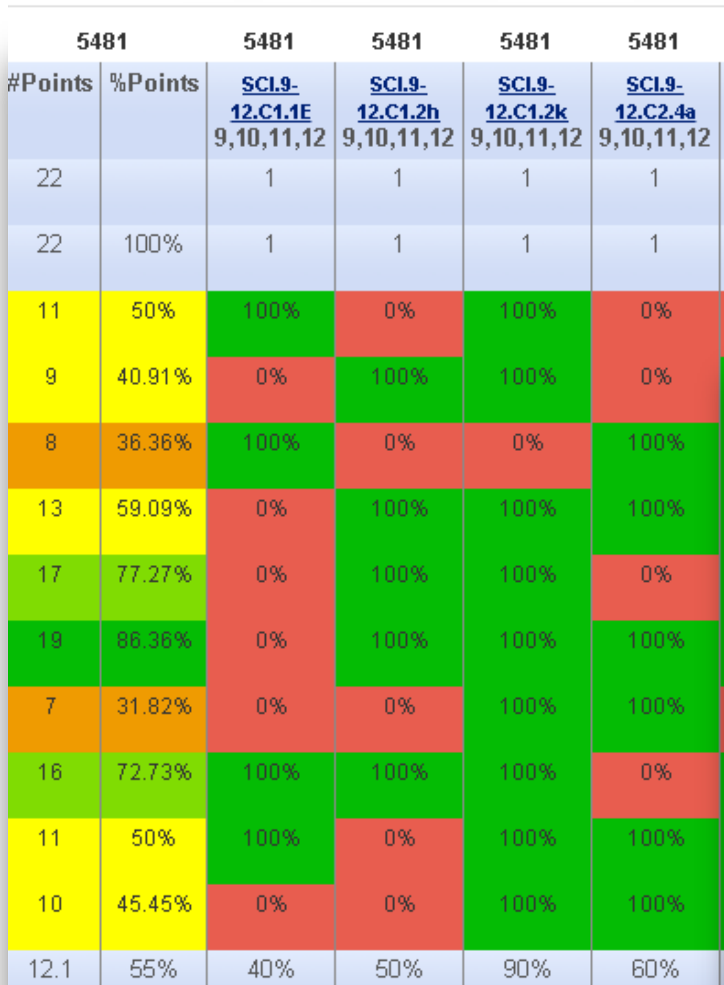
LOCAL AND REGIONAL ASSESSMENTS FOR SCIENCE



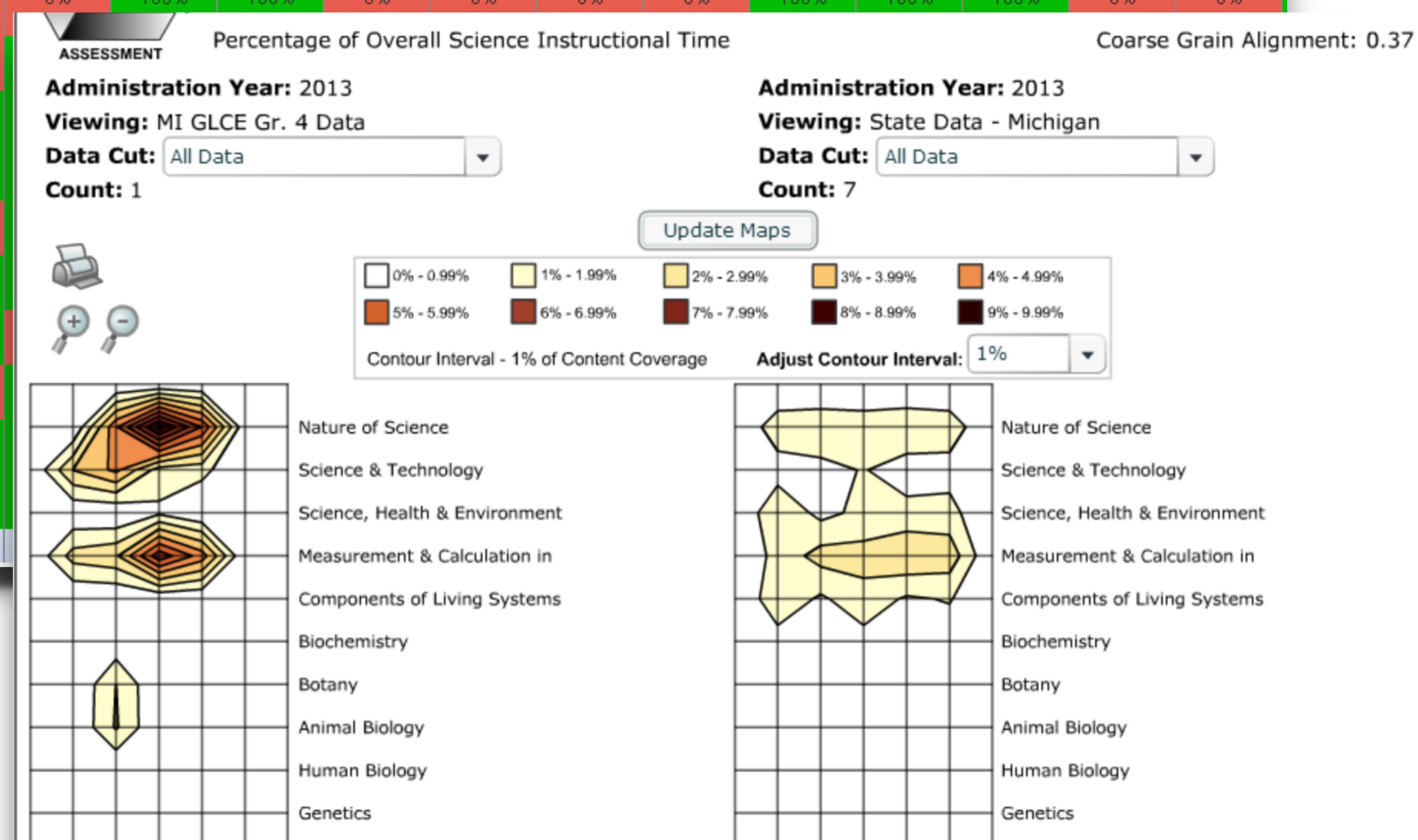


Data analysis to support professional learning & school improvement

LOCAL AND REGIONAL ASSESSMENT OUTCOMES

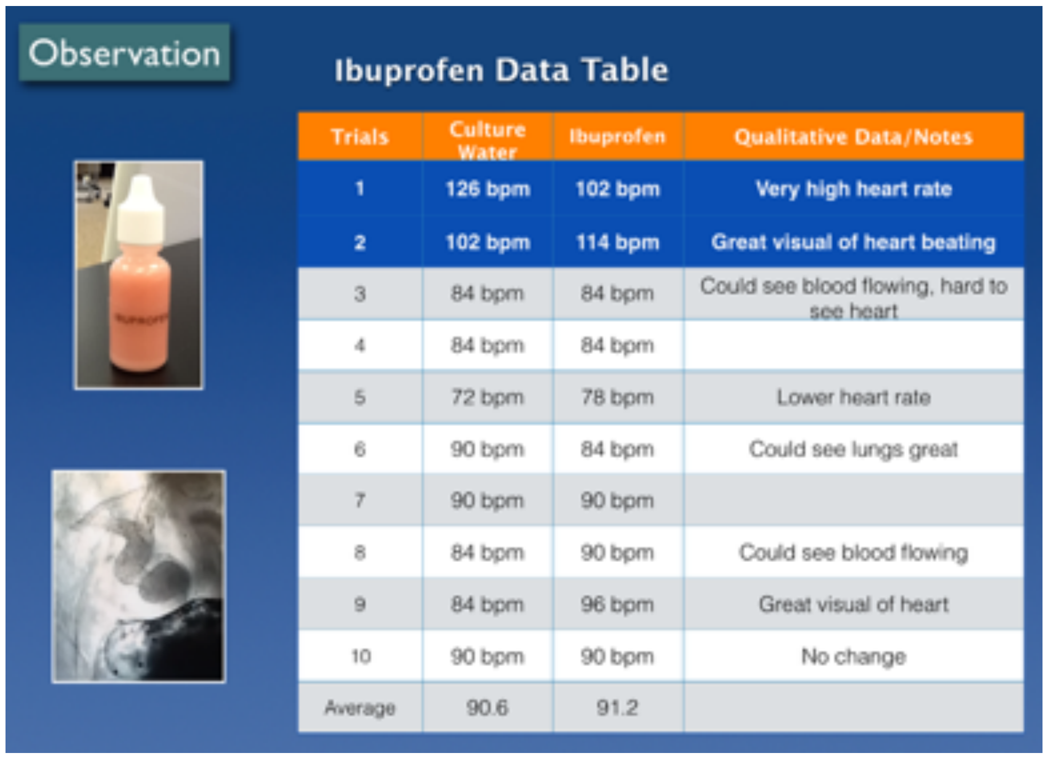


5481		5481	5481	5481	5481	5481	5481	5481	5481	5481	5481	5481	5481	5481	5481	5481	5481
#Points	%Points	SCI.9-12.C1.1E 9,10,11,12	SCI.9-12.C1.2h 9,10,11,12	SCI.9-12.C1.2k 9,10,11,12	SCI.9-12.C2.4a 9,10,11,12	SCI.9-12.C2.4b 9,10,11,12	SCI.9-12.C2.4c 9,10,11,12	SCI.9-12.C2.4d 9,10,11,12	SCI.9-12.C4.10A 9,10,11,12	SCI.9-12.C4.10c 9,10,11,12	SCI.9-12.C4.10d 9,10,11,12	SCI.9-12.C4.10e 9,10,11,12	SCI.9-12.C4.7b 9,10,11,12	SCI.9-12.C4.8A 9,10,11,12	SCI.9-12.C4.8B 9,10,11,12	SCI.9-12.C4.8C 9,10,11,12	SCI.9-12.C4.8e 9,10,11,12
22		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22	100%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11	50%	100%	0%	100%	0%	0%	100%	100%	0%	0%	0%	0%	100%	100%	100%	0%	0%
9	40.91%	0%	100%	100%	0%												
8	36.36%	100%	0%	0%	100%												
13	59.09%	0%	100%	100%	100%												
17	77.27%	0%	100%	100%	0%												
19	86.36%	0%	100%	100%	100%												
7	31.82%	0%	0%	100%	100%												
16	72.73%	100%	100%	100%	0%												
11	50%	100%	0%	100%	100%												
10	45.45%	0%	0%	100%	100%												
12.1	55%	40%	50%	90%	60%												



Individualizing student and teacher decisions

CLASSROOM AND SCHOOL ASSESSMENTS FOR SCIENCE

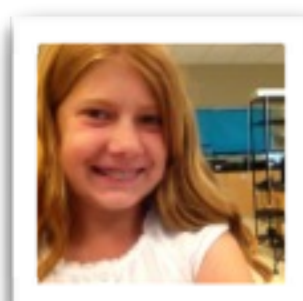


Observation

Ibuprofen Data Table

Trials	Culture Water	Ibuprofen	Qualitative Data/Notes
1	126 bpm	102 bpm	Very high heart rate
2	102 bpm	114 bpm	Great visual of heart beating
3	84 bpm	84 bpm	Could see blood flowing, hard to see heart
4	84 bpm	84 bpm	
5	72 bpm	78 bpm	Lower heart rate
6	90 bpm	84 bpm	Could see lungs great
7	90 bpm	90 bpm	
8	84 bpm	90 bpm	Could see blood flowing
9	84 bpm	96 bpm	Great visual of heart
10	90 bpm	90 bpm	No change
Average	90.6	91.2	

Rubrics are used to guide educators toward quality assessment of student understanding (from artifacts) and appropriate instructional response



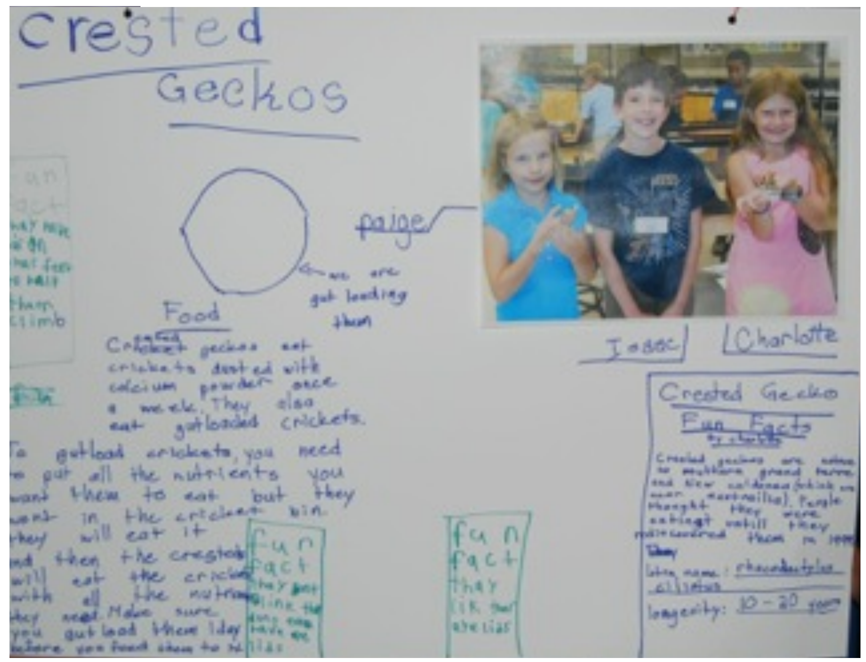
Claim: I claim that when introduced to the xenopus tadpole, these painkillers will most likely make the heart rate go up, or it will stay the same, but rarely go down.

Evidence: Almost all of my trials support my claim; they all either stayed the same, or went up. For the example 24/30 trials either went up or stayed the same, and the average of all the trials is 87.2 in water, and 91.8 when the painkiller is introduced.

Reasoning: I did ten trials for each type of medicine, so my investigation was a fair test, and I looked for all potential sources of error, and if there was one, I restarted, so I am strongly confident in my investigation. I had also known from second hand research that these medicines had no known stimulants or depressants, so it wouldn't make much of a difference.

CLASSROOM AND SCHOOL ASSESSMENTS FOR SCIENCE

Common local assessments



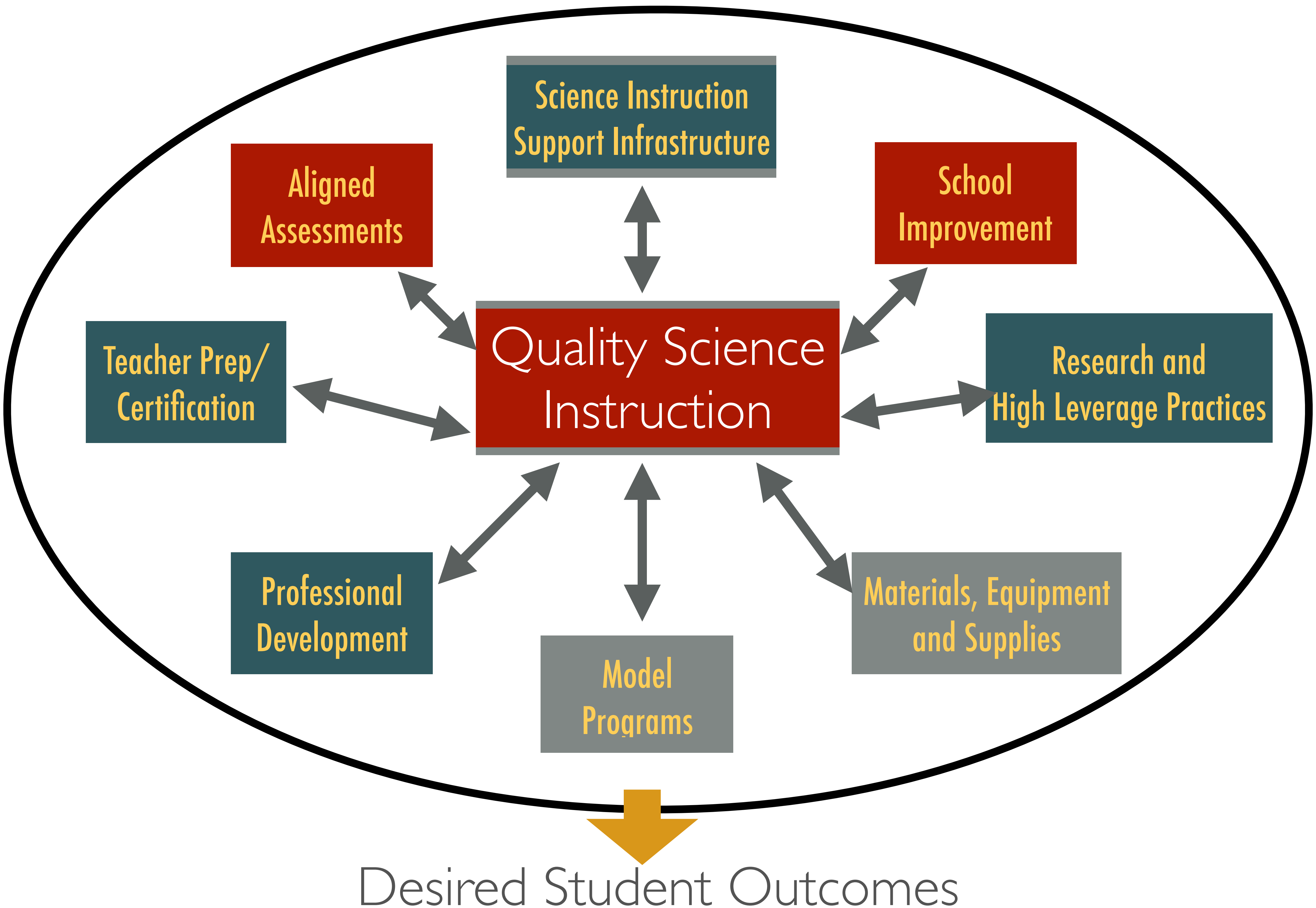
Analysis of student artifacts

Performance assessment

CLASSROOM AND SCHOOL ASSESSMENT OUTCOMES

	Common Assessments	Analysis of Student Artifacts	Performance Assessment
Immediate outcomes	• Curriculum coverage • Address general misunderstandings	• Coherence among staff and classes • Address individual misunderstandings	• Probe for depth of understanding • Address student misunderstandings
Annual / Biannual outcomes	• Curric. alignment • Student learning objectives for teacher evaluation	• Depth of understanding • Student learning objectives for teacher evaluation	• Instructional change for depth of understanding • Student interest / motivation
Long Term outcomes	• Student growth/ improvement over time • School improvement	• Individual student growth • Student learning objectives for teacher evaluation	• Authenticity of work • Greater depth of understanding • Peer evaluation

ACHIEVING THE VISION



CONTACTS

Venessa Keesler
Deputy Superintendent
keeslerv@michigan.gov

Andrew Middlestead
Director, OSA
middlesteada@michigan.gov

Linda Forward
Director, OEII
forwardl@michigan.gov

Stephen Best
Assistant Director; OEII
bests1@michigan.gov

MICHIGAN Department of Education